Environmental Assessment Report

Initial Environmental Examination
Project Number: 42094
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Proposed Multitranche Financing Facility and Administration of Grant from the Japan Fund for Poverty Reduction
Islamic Republic of Afghanistan: Energy Sector Development Investment Program

NEPS 220 kV Transmission Line (Kunduz–Taloqan)

Prepared by: Da Afghanistan Breshna Sherkat, Islamic Republic of Afghanistan for the Asian Development Bank.

Asian Development Bank

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Abbreviations

ADB	-	Asian Development Bank
CSC	-	Construction Supervision Consultant
DABS	-	Da Afghanistan Breshna Sherkat
EHSM		Environmental Health and Safety Manager
EIA	-	Environmental Impact Assessment
EMF	-	Electric and Magnetic Field
EMP	-	Environmental Management Plan
EMAP	-	Environment Management Action Plan
EMMP	-	Environmental Management and Monitoring Plan
EMoP	-	Environmental Monitoring Plan
ESSU	-	Environment and Social Safeguard Unit
IEE	-	Initial Environmental Examination
IEIA	-	Initial Environmental Impact Assessment
MM	-	Man month
MOI	-	Ministry of Interior
NEPA	-	National Environmental Protection Agency
NEPS	-	North East Power System
NGO	-	Nongovernmental Organization
PCB	-	Poly Chlorinated Biphenyl
PIU	-	Project Implementation Unit
PPTA	-	Project Preparatory Technical Assistance
REA	-	Rapid Environmental Assessment
ROW	-	Right-of-Way
SEIA	-	Summary Environmental Impact Assessment
SIEE	-	Summary Initial Environmental Examination
TA	-	Technical Assistance
TOR	-	Terms of Reference
UNEP	-	United Nations Environment Programme

Units		
cm	-	Centimeter
oC	-	Degree Celsius
dB	-	'A' decibel
GWh	-	Gega watt hour
Kg	-	Kilogram
km	-	Kilometer
KV	-	Kilo volt
KW	-	Kilo watt
m	-	Meter
mg/L	-	Milligram per liter
mm	-	Milli meter
m3/s	-	Cubic meters per second
MW	:	Mega watt

1. Introduction

1. Years of conflict has left Afghanistan as one of the poorest post-conflict countries in the Asia and Pacific region. Currently the country has severely damaged power generation, transmission, and distribution systems, leaving most of the country's 28 million people with no access to reliable, modern forms of energy. Only about 9% of the country has access to electricity. More than 85 percent of Afghanistan's energy needs are met by traditional fuels and more than 80 percent of the population lives in rural areas who depend on these traditional sources. Use of fuel wood, crop residue and kerosene has led to serious deforestation, adverse impacts on watersheds, air quality and human health.

2. The Afghanistan government and international donor community has being developing the North East Power System (NEPS), as a flagship program, to provide improved access to electricity in the North East region of Afghanistan. The electricity is being imported from the Uzbekistan and Tajikistan through NEPS to provide electricity to various cities in Afghanistan. This project is focusing on the construction of a new 220kV double circuit transmission line between the city of Kunduz and Taloqan, as an extension of the NEPS.

3. The NEPS will help spur economic development and reduce poverty in the region. The project will specifically benefit the poor and vulnerable groups, including women, by providing access to electricity for their household activities which will help in reducing the use of poor quality fuel for cooking and in coping with environmental degradation and health risks. It will also help improve learning opportunities for children, allow home-based businesses to expand into small-scale commercial or industrial operations, improve agriculture and result in net savings to customers as electricity is cheaper than kerosene and fuel wood. The projects will enhance the standard of life of the people through its direct, indirect and induced positive impacts.

4. This IEE has been prepared on the basis of preliminary field investigations, data analysis, and review of other electricity network development project reports in other Asian countries. The environmental impact was considered for physical, environmental, ecological, social and cultural resources within the project facilities during construction and operation phases. This report was prepared with the active cooperation of the DABS and ADB's project team in Manila.

2. Description of the project

2.1 Need for Project

5. A county's economic growth and its people's living standards are highly dependent on electricity. Afghanistan's very small population has very limited access to clean and cheap energy sources. To improve country's economic condition and to increase access to electricity, the Government is developing projects to generate power within the country and to also bring in power from neighboring countries.

6. The project aims to provide electricity supply and improve reliability and coverage by providing a new transmission line from the city of Kunduz to Taloqan. The project connects the town's networks with the NEPS of Afghanistan, thereby providing electricity to larger population in more effective and continuous manner. The project will help increase the pace of economic development in Afghanistan.

2.2 Details of the Project

7. The project is designed to address the following considerations:
    a. A 67km long, 220kV D/C double circuit transmission line between city of Kunduz and Taloqan.
    b. The transmission line traverses through undulating terrain and the ratio of suspension towers to tension towers has been assumed as 70:30 while the ratio of light angle tower to heavy angle tower has been assumed 60:40.
    c. L/M zone design, similar to the Khinjan-Doshi-Pul-e-Khumri area has been considered for the power grid.
    d. Within the city of Kunduz, the transmission line will be constructed over poles with around a $2m^2$ footprint. The route will be alongside the existing utility corridor and infrastructure. Poles in the city will be with a spacing of 250m each.
    e. The tower foundations will be designed by the engineers based on the detail soil investigation.

2.3 Project Location

8. The transmission line connects capital city of Kunduz in Kunduz Province to the capital city of Taloqan in Takhar Province (Annex C). The transmission line will run between the existing sub-station at Kunduz (36.74 E, 68.86 N) and a new substation at Taloqan (36.73 E, 69.48 N) The transmission line is around 67 km long and will pass through various villages, agricultural land, desert, hills, valleys and river banks. Annex A – Map 1 provides an aerial view of the transmission line route while Table 1 provides the longitudes and latitudes for the angle points of the alignment:

Table 1. Transmission Line Route, GPS location

No	Longitude/Latitude			Comments
	Degree	Minute	Second	
Sub	36	44	47.111	Kunduz Substation
	68	51	53.861	
1	36	42	24.207398	First Angle point in Se Darak
	68	51	43.71178	
2	36	42	20.323	Inside the Village
	68	51	52.062	
3	36	42	17.701	Inside the houses
	68	51	58.314	
4	36	42	13.974	Inside the Garden
	68	52	2.915	
5	36	42	12.226135	Private and Agriculture Land
	68	52	7.1902681	
6	36	40	9.822195	Near Airport in agriculture land
	68	53	22.129896	
7	36	39	24.985	Inside the house
	68	53	37.057	
8	36	39	24.017155	Open area in desert
	68	53	43.946532	
9	36	41	22.798	Top of the hill
	69	9	39.432	
10	36	43	41.103213	Valley of Bangy
	69	12	15.264466	
11	36	43	41.167912	Near to the mountain
	69	12	15.385589	
12	36	43	23.798933	Private and Agriculture Land
	69	14	52.526232	
13	36	43	27.705077	Open area in desert
	69	15	2.4159994	
14	36	44	53.840573	Government open area
	69	20	4.1854096	
15	36	43	10.931387	Top of the hill
	69	22	36.241629	
16	36	42	47.347339	Private and Agriculture Land
	69	27	54.729522	
17	36	43	16.852453	Main Road of Kunduz, Taloqan
	69	28	9.9443019	
18	36	43	50.822692	River of Taloqan
	69	28	28.374913	
19	36	44	6.3690509	North side of river
	69	29	8.2668997	
20	36	44	9.6246427	Last angle pole
	69	29	13.690411	
Sub	36	44	15.629987	New Taloqan Substation
	69	29	21.228212	

Source: NEPS 220KV Transmission line (Kunduz –Taloqan) Land acquisition and Resettlement – Route Survey and GPS point, Environmental and Social Safeguard Report by SMEC International.

NOTE: Approx 40km of the alignment could not be surveyed due to lack of UXO clearance.

2.4 Project Category

9. This project has been categorized to Environmental Category “B” (judged to have minor and limited adverse environmental impacts, of lesser degree and/or significance than those for category A Projects) and therefore an IEE has been prepared for this project. The adverse impacts are expected only during the construction stage and the long term impacts can be managed through proper environmental planning, management and monitoring in later years.

3. Description of the Environment

3.1 Physical Resources in Project Area

3.1.1 Topography

12. The project site is located in the northern region of Afghanistan, north of Hindu Kush Mountains. The Hindu Kush Mountains traverse the centre of the country, running generally in a northeast southwest direction. The mountain ranges in Hindu Kush system include smaller mountain ranges of the Koh-e Baba, Salang, Koh-e Paghman, Spin Ghar (also called the eastern Safid Koh), Suleiman Range, Siah Koh, Koh-e Khwaja Mohammad and Selseleh-e Band-e Turkestan.

13. The transmission line route is in the north western side of Koh-e Khwaja Mohammad range. The Kunduz substation is in north of the Kunduz city and the proposed route passes through the city to the southern end near the airport. This section of the route lies in the low lying area and near the flood plains of Kunduz River (Annex B). From the fertile low lying areas of Kunduz city outskirts the route passes through the low lying mountains and an open desert area south to Khanabad until it arrives at the hills of the Bangee Valley. The alignment then drops into the valley and run parallel to the main road through hills and private agricultural land. The route near the south west of Taloqan lies in low lying fertile land near and in the floodplains of River of Taloqan. The transmission line will cross the river to reach the proposed Taloqan substation which lies in open desert area to the west of the city. (Annex A: Image 1 – Image 11). Kunduz city and area south to Kunduz city (GPS point 1 – 7) are at elevation of around 350m from the mean sea level and the area here onwards is at a slightly higher elevation (GPS pint 8 - 11). The area west to Taloqan (GPS 12-20) is at a greater elevation around 800- 1200m but still lower than the surrounding Mountain ranges, suggesting valley topography (Annex B). The GPS points 9 – 16 are located on a steep slope between 25 and 40 percent while the rest of the locations are within 25 percent slope (Annex B).

3.1.2 Soil Characteristics

14. Soils in the project site primarily consist of sediments eroded from the mountains and comprise alternating layers of gravels, sands, silts and clays. Adjacent to the mountains, the sediments are dominated by coarse deposits such as gravels and pebbles, deposited by the runoff water from the mountains. Further away from the mountains, the deposits would be expected to become increasingly dominated by finer sediments such as fine sands/silts. The flood plains of rivers at Kunduz and Taloqan contain fertile sandy soil.

3.1.3 Geology

15. Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The Tadjik block of northern Afghanistan

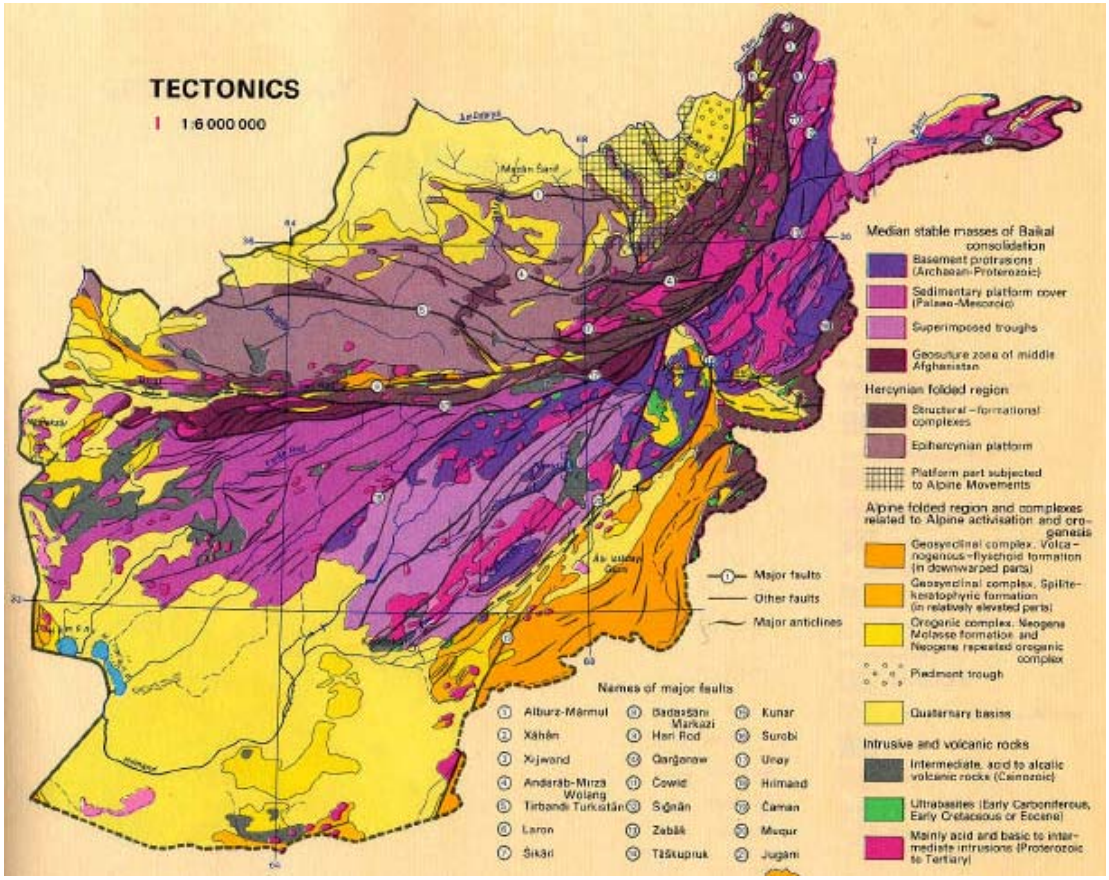
formed the southern margin of the Eurasian continental plate during Permo-Triassic times. The Palaeozoic basement was intruded by Triassic granitoids as a result of subduction related to the first stages of the closure of the Tethys Ocean during the Cimmeride Orogeny. Subsequent to this, a Jurassic clastic sequence was deposited, which changes upwards to Cretaceous carbonate platform sedimentation. This area is now the prime target for hydrocarbon exploration, although the exposed granitoids in the northeast of the block are prospective particularly for precious (and base) metal mineralisation, and further exploration of the occurrences identified to date is warranted.

16. The hilly areas of Kunduz River Valley consisting of Palaeogene and Neogene sediments covered by Loess deposits of 30 m to more than 100 metres thickness in the centre and along the rivers several wide flood plains have been formed. The flood plains consist of highly fertile medium grained soils with good agricultural land, which comprises the main economic centers of the basin.

3.1.4 Seismicity

17. The project area is in Hercynian folded region and subjected to Alpine movements. It lies in seismically active zone but does not lie directly on any fault line of Hindu Kush range.

Figure 1. Tectonic Map of Afghanistan

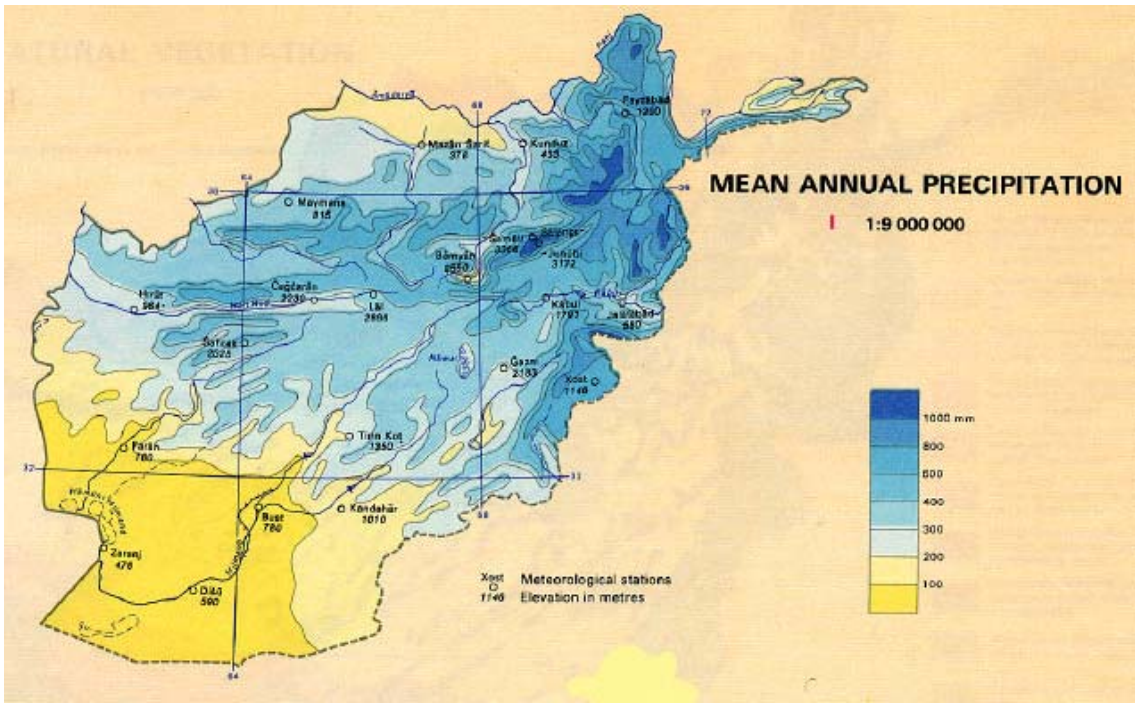


Source: GEOCART, "*National Atlas of the Democratic Republic of Afghanistan*", Warsaw, 1984.

3.1.5 Climate

18. Afghanistan's climate is continental, with temperatures ranging from +30°C in summer to -20°C in winter. The climate comprises of four distinct seasons with winter in December to February, spring from March to April, summer from May to September and autumn from October to November. Rainfall varies from a low of 75 mm in Farah to 1170 mm in south Salang, occurs mostly in the winter months and particularly in the February-April period. The project corridor receives an annual precipitation between 400-800 mm.

Figure 2. Annual Precipitation of Afghanistan



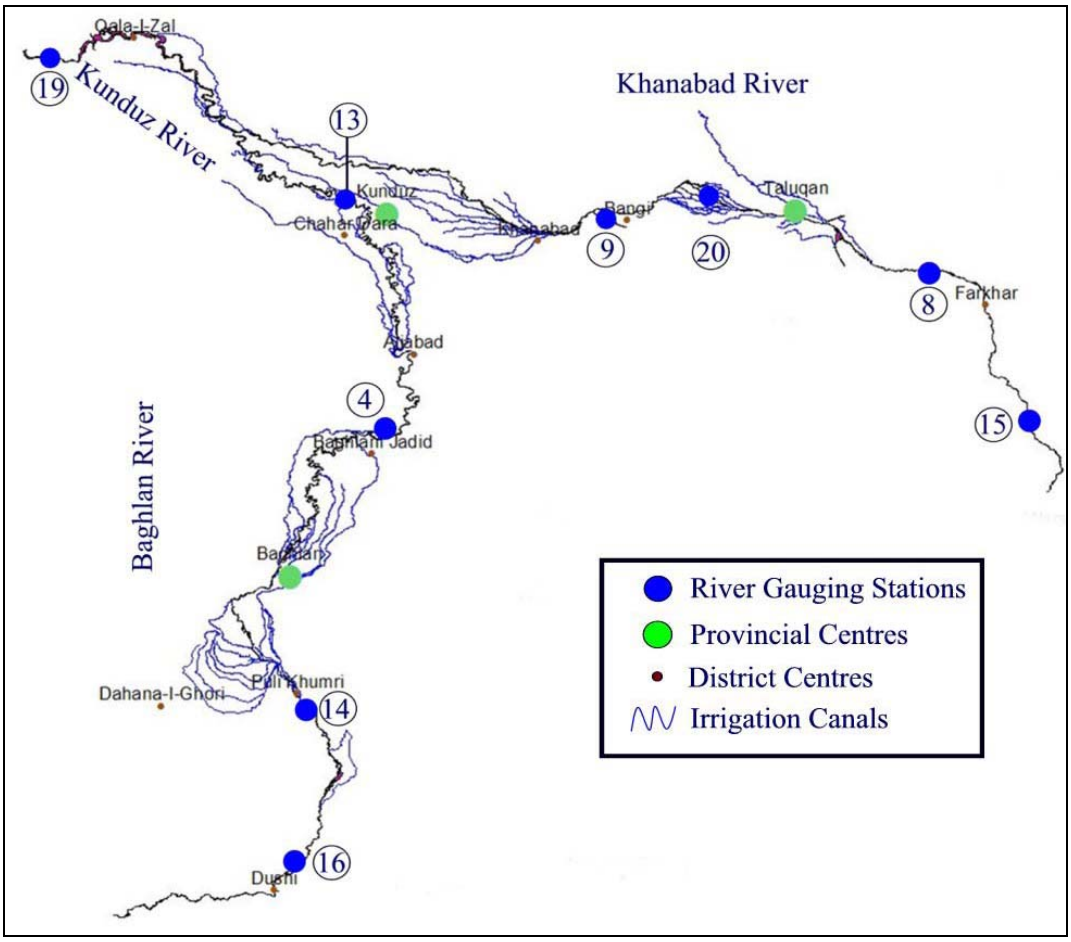
Source: GEOCART, "*National Atlas of the Democratic Republic of Afghanistan*", Warsaw, 1984.

3.1.6 Water Resources

19. Afghanistan's water resources are divided into five major river basins, which comprise 41 watersheds. The major river basins are (i) the Amu Darya River Basin, which contributes 57 percent of the total river flow in Afghanistan, (ii) The Northern River Basin, (iii) The Harirud-Murghab River Basin, (iv) The Hilmund River Basin and (v) The Kabul (Indus) River basin.

20. The project area is on the Nothern side of the Hindu Kush Mountains in the perennial Kunduz River basin. The Kunduz river is part of Amu-Darya River basin and both are rain and snow fed. The rivers in the Kunduz River Basin have different local names and the rivers in this document are called Kunduz River and Taloqan River based on their vicinity to the respective cities. The area gets substantial snow during the winter months. Heavy spring and summer snowmelt runoffs from the surrounding mountain feed into the Kunduz and Taloqan Rivers through valleys. The route, for several kilometers, runs near the River of Taloqan and crosses it near the Taloqan sub-station.

Figure 4. Kunduz river Basin



Source: TA to the Ministry of Energy and Water for the Implementation of the Food Security/Water Management Project in Kunduz, Baghlan and Takhar Province, "*3rd River Basin Planning Report" – Kunduz River Basin Programme*, Landell Mills Development Consultants

3.1.7 Air and Noise Quality

21. The project area is a 67km corridor running through Kunduz city, villages, road sides, deserts, hills and valleys. The air quality will vary from clean air in pristine areas to polluted air in cities and suburbs due to traffic, dust from unpaved roads and smoke from traditional fuel usage. During late autumn and winter, air quality is reportedly worsened by domestic emissions arising from increased use of ovens, stoves and open fires. The desert and open areas along the corridor are subject to strong winds and dust generation. The route also runs parallel to main road south of Kunduz and west of Taloqan along the Kunduz-Taloqan highway, and these locations may witness pollution from heavy vehicles.

22. It is expected that most of the region will have low levels of background noise typical of undeveloped rural areas while medium noise levels near roads and in city area.

3.1.8 Irrigation

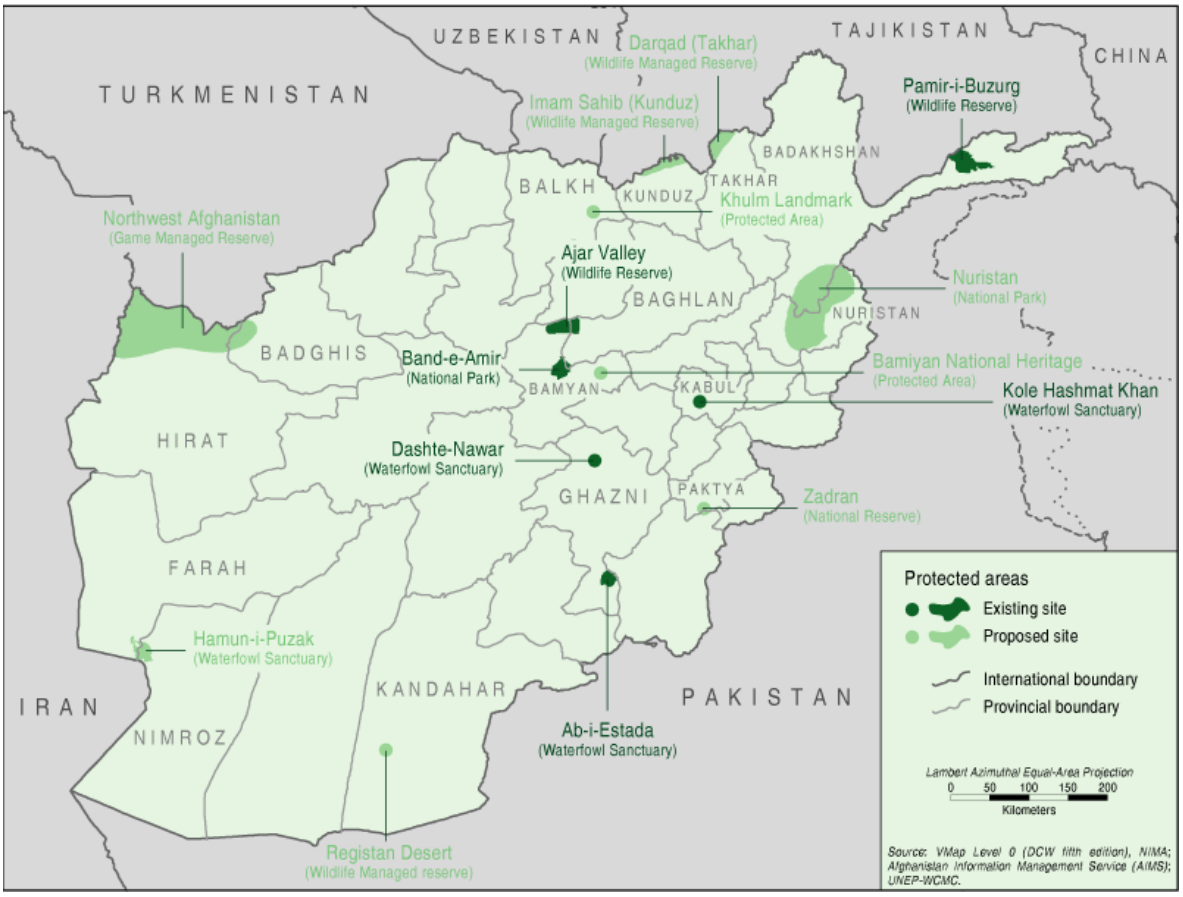
23. Agriculture has been the mainstay of the Afghan economy and irrigation traditionally provides 85% of all crop production. Since 1978, the irrigable area has declined by about 60% turning a country that was approaching self-sufficiency in crop production into a major importer of food grains, fruit and vegetables. Rivers, canals and springs are the major sources of irrigation in the sub-project area. According to the 1980 yearbook of statistics of the Government of Afghanistan, (for data compiled during 1967-68) 84.6 percent of irrigation water comes from rivers and balance requirement comes from groundwater through wells and springs.

3.2 Ecological Resources in Project Area

3.2.1 Protected Area

24. Afghanistan currently has six existing protected areas. Twelve natural sites and additional three cultural heritage sites may be added to Afghanistan's protected areas system. Two protected areas are found in Kunduz and Taloqan provinces; the Imam Sahib Wild Life Management Reserve and Darqad Wildlife Management Reserve but both are a considerable distance away from the project area are near the border of Afghanistan and Tajikistan. Therefore there are no protected sites or biodiversity hotspots in the proposed project area.

Figure 4. Existing and proposed protected areas in Afghanistan



Source: Maps and Graphics, UNEP

3.2.2 Land Use

25. The transmission line route traverses through residential areas, private agricultural land, government land/open areas, roads, gardens, desert, hills, valley and river banks. From the Kunduz substation in north of the city till the GPS point 6 in the southern end, near the airport, and further till GPS point 8, the last point near Kunduz city, the land is heavily populated and is primarily used for residential, commercial, roads and agricultural purposes (Annex A: Image 2 – Image 5). Some land in this area also belongs to the Government. GPS point 8 sits on top of a small hill and from this point onwards the route passes through the desert area, bypassing Khanabad towards the hills of Hindu-Kush mountain range ((Annex A: Image 6 – Image 7). This stretch of the alignment between GPS points 8 & 9 may contain landmines. The route arrives at the village of Jaar-e-Mula karim near the main Kunduz-Taloqan road. There are housesclose to the alignment at this point. The alignment then follows the main road, parallel to the River of Taloqan in the Bagee Valley of Bangee (Annex A: Image 8 – Image 10). The land surrounding the Taloqan sub-station (GPS points 16 – 20) consists of agricultural land, flood plains and roads. The Taloqan sub-station is located near the banks but away from agricultural land. It is predominantly a dry desert patch towards the West of the city (Annex A: Image 11).

26. Detail information on Land cover for Kunduz and Takhar Province is provided under Annex C.

Table 2: Land Cover Classification in the Kunduz Watershed

Degenerated forests/High Shrubs	0.30
Fruit trees	0.03
Irrigated : intensively cultivated (1 crop/year)	3.69
Irrigated : intensively cultivated (2 crops/year)	0.92
Irrigated: intermittently cultivated	0.83
Marshland : Permanently inundated	0.29
Natural Forests (closed cover)	0.18
Natural Forests (open cover)	0.57
Permanent Snow	0.92
Rainfed crops (flat-lying areas)	1.83
Rainfed crops (mountain slopes)	8.93
Rangeland (grassland/forbs/low shrubs)	75.25
Rock outcrop/Bare soil	5.64
Watershed area (sq.km)	28,023.6

Source: Watershed Atlas of Afghanistan, 2004

3.2.3 Flora

27. Northern Afghanistan forms part of the center of plant diversity for the mountains of middle Asia. The northern highlands between 1000-1500m have steppe grasslands and low shrubs. Small areas of Coniferous forest grow at high altitude and the woody plants in the mountainous areas comprise sparse wild pistachio (*Pistachia*), almond (*Amygdalis*) and juniper woodland with tree heights of 4-10 meters. Above 3500m only low Alpine flora exists.

28. Overgrazing combined with an increasing population and the corresponding demands for fuel wood over recent decades have resulted in extensive decline of these woodlands. The grasses, sparse shrubs and trees that form the natural bvegetation of the region dry out in

summer. The traditional Poplar and Willow hedges are cultivated by farmers in the river plains for subsistence. Herb and grasses are scarce in rangeland areas where invasive plants like thistles dominate.

3.2.4 Fauna

29. The fauna of Afghanistan is of international importance as it is home to many flagship endangered species such as the markhor (*Capra falconeri*), Marco Polo sheep (*Ovisammon poli*), musk deer (*Moschus moschiferus*), snow leopard (*Uncia uncia*), and Siberian crane (*Grus leucogeranus*). Animals found in Mountains of Hindu Kush are leopard (*Panthera pardus*), lynx (*Felis lynx*), wolf (*Canis lupus*) and Jackal (*Canis aureus*). However, active hunting is occurring in many regions of the country for fur and has caused declines in the numbers of indigenous fauna.

30. The Avifauna of dry grassland includes lesser floricans, pipits, sparrows and weavers. Sandgrouse and larks are found in most arid deserts while the cultivated areas are home to drongons, Indian robins, pied bushchats mynas, bulbuls tailor birds, weavers etc. Open deciduous forests are home to minivets, fantails, woodshrikes, bulbuls, sunbirds and white-eyes and the coniferous forest provide breeding ground to pheasants, treecreepers, tits, streaked laughing thrushes, with dippers and froktails along the mountain streams. Brandt's Mountain Finches survive at altitudes of around 6000m in the Hindu Kush.

31. Afghanistan is part of Central-Asian Flyway for migratory birds. Many migratory birds from Siberia and Central Asia reach the wetlands of India, Iran or Pakistan via Afghanistan. Numerous species of migratory waterfowl and waders that seasonally use Afghanistan's wetlands of Hamun-i-Puzak and Hamun-i-Helmand on the Iranian border, and Ab-i-Estada and Dashte Nawar for feeding, breeding, and rearing their young. These sanctuaries are in south Afghanistan and far from the project site.

3.2.5 Fisheries

32. Fishing in rivers and streams near the proposed project corridor is very limited, and information on the number of fisherman, fish species captures, yields and total catch does not exist. It is observed that fish do not contribute much to the economy of the country and therefore not much attention is paid aquatic resources. No fish species in Afghanistan are classified as endangered. Some of the fresh water fishes in Afghanistan are Barbel, Carp, Mahi-e-saqan qul and Mahi laqa which is especially found in the Kunduz river.

3.3 Socioeconomic Resources in Project Area

3.3.1 Population

12. Kunduz district has an estimated population of 258,400 with around 111,600 children under 12 years of age and 22,380 female households. Taloqan district currently has around 250,000 to 300,000 people.

3.3.2 Socioeconomic Infrastructure

13. Kunduz is linked by highways with Mazar i Sharif to the west, Kabul to the south and Tajikistan's border to the north. Several different ethnicities live in the city, namely the

Tajiks, Aimaq, Uzbek, Pashtun and Hazara. Nearly 100% of the population has access to portable water, but the water is not always clean and safe. In the city of Kunduz people take drinking water from wells or irrigation canals. Sanitation and drainage facilities are not satisfactory but better than in other districts in the province. The district has one functional hospital and medicines are available in local bazaars. Kunduz city is better served in terms of education than other districts and the total number of pupils is 42, 900. Kunduz has better employment opportunities than other districts in the province due to business conducted in Kunduz city. Infrastructure in Kunduz is very good and all areas are accessible by road. The main sources of income in the region are agriculture, business and laboring.

14. The potable water in Taloqan comes from the shallow wells, canals and rivers and is generally available to all in the district. Many residents are reliant on the unclean river water but none of the villages are without any water. The traditional systems of sanitation and drainage are still prevalent in the district. The district has one hospital, one clinic, a mobile clinic and 65 pharmacies which serve both the town and villages. There are 6 high schools and 27 primary schools but all have a shortage of school materials and classrooms.

15. In economic terms Kunduz is performing well and is thriving. The surrounding agricultural lands are generally productive and the main industrial activities in Kunduz include production of ice, textiles, oil and flour processing.

16. Business, farming and laboring are the main source of income in Taloqan district. Taloqan has a large market and provides good employment and people from neighboring districts come to work as laborer. Taloqan also has salt mines, Afghanistan's major mineral resource.

3.3.3 Agriculture and livestock

17. Kunduz is the country's most important agricultural province which produces wheat, rice, millet, cotton, watermelons, vegetables and other products and is known as "the hive of the country." There is a good irrigation system throughout the district and six irrigation intake canals support the crops in the region. The agricultural land around the city area is intensely cultivated, producing one or two crops a year. the main crops in region are rice, wheat, barley and flax. Production has decreased in recent years due to the drought. Animal husbandry is not common in the area in contrast to the rest of the province.

4. Screening Environmental Impacts and Mitigation Measures

3.1 Physical Environment

3.3.4 Soils and Geology

18. **Construction Period**: The construction of transmission lines requires the construction of foundations to increase the stability of the towers. The depth and type of foundation will be determined by the local soil properties and geology. The greatest impact of construction on the soil and geology is in terms of soil erosion. The extent of impact depends upon the erosion potential of the soil. The detailed soil properties will be known only after soil testing but based on the preliminary studies, regional information on soil type and lack of vegetation cover in most of the project area, it is expected that the potential for soil erosion is high. Erosion potential is anticipated to increase at places where towers are to be placed at slopes greater than 20°. The construction process will potentially remove vegetation and disturb the upper soil layer making it more susceptible to increased erosion and runoff.

19. Possible impacts also include increased erosion during construction and use of access/maintenance roads to tower sites, damage to local existing roads during transportation of construction material and equipment, erosion of stockpiles during rain, re-suspension of dust during the dry weather and oil leakage or hazardous material spills from vehicles and/or equipment. The areas that will be subjected to disturbance will be very small and potential impacts are considered insignificant. However, implementation of appropriate mitigation measures will prevent or minimize the impacts.

20. The project location is in seismically active zone and towers at steep slopes might need special design and safety considerations. Also, some of the tower locations are on high and steep mountain terrain and the special care will be required for the transportation of construction material and transmission line equipment.

21. **Operational Period:** During operation the potential for environmental impacts is low and limited to soil erosion due to maintenance and use of access roads. The soil erosion potential may be high in steep areas with soils prone to erosion. Access roads built through the steep mountain terrains needs special consideration to avoid any steep rise or fall and steep curves to avoid accidents.

22. **Recommendations:** In order to minimize the potential of soil erosion, following mitigation measures are recommended:

    a. As far possible, use the existing access roads during construction and maintenance of transmission line.
    b. In the hilly terrains ensure special care to determine the route of access roads to avoid steep gradients.

c. Areas disturbed during construction (eg. Excavation for foundation, materials etc) should be appropriately rehabilitated and, if necessary, re-vegetated.
d. Spoils from the cut areas and removed rocks should be used for in-filling of erosion gulleys or rehabilitation of excavation pits or construction of boundary walls around the tower or construction of access roads.
e. Many towers in the south western region of Taloqan will be located on steep terrain, the GPS points 9 – 16 are at slopes greater than 25 percent and need special design and erosion control measures.
f. Rehabilitation of areas susceptible to erosion will be undertaken and will be adequately protected by soil conservation measures.
g. Proper maintenance of vehicles and equipment is recommended to avoid any leakage. Kits to cleanup any spillage should be made available at all construction sites and the contaminated material should be disposed appropriately.
h. A detailed EMP should be compiled by the contractor, outlining site specific measures to be implemented to minimize impacts on soil and topography.

3.3.5 Surface water

23. **Construction Period:** The transmission line, for many kilometers, lies close to the Taloqan River and crosses over the river, near the Taloqan substation. As large scale construction activities have the potential to increase the erosion rates leading to increases in the turbidity of surface water run off. Dust generation can also be a problem during dry periods, especially as the much of the project area is arid zone. The issues of erosion and dust are considered significant but can be minimized by proper mitigation measures.

24. As the transmission line will be crossing over a river, towers will need to be located out of the flood plains and away from river banks if possible to avoid flood damage and impacts on drainage lines. The siting of towers away from water courses is also necessary to avoid erosion damage during floods Other activities like driving vehicles through streams, building temporary bridges, or clearing of brush from the ROW can affect the water temperature and aquatic life. Overhead transmission lines across river may pose a potential collision hazard for waterfowl and other large birds.

25. Wastewater will be generated during the construction phase near the housing or camping facilities provided to workers. No discharge of untreated sewage will be permitted and septic tanks will be contructed at each of the work camps..

26. **Operational Period:** During operation phase the water quality could be affected by increased soil erosion; change in stream flow patterns and scouring of the river bed near the towers, if towers are places within the flood line. These impacts will be temporary and minor significance.

27. **Recommendations:** In order to minimize the potential of increase of surface water turbidity, pollution and disturbance to stream flow, the following mitigation measures are recommended:
    a. Placement of towers on the River banks and within 1:50 year flood lines should be avoided as far as possible to avoid soil erosion into the stream.
    b. Where new access roads are to be constructed, they should not disturb the natural drainage patterns of the area and if the river is crossed, special attention should be given to prevent change in flow patterns.

c. Vegetation stripping should occur in parallel with progress of construction in order to minimize erosion and runoff.
d. Exposed area should be re-vegetated as soon as possible on completion of construction within each area.
e. To prevent sedimentation of the river channel during construction, any excavted material should be stockpiled alongside the site for re-use or disposed of to a suitable site as soon as possible. If soil has to be stored on site for a period of time, then it should be grassed, covered or bunded at a location away from the river.
f. Provide sanitary latrines at the construction, work site and camps to avoid any pollution of groundwater and surface water from sewage and maintain hygienic environment. Also, septic tanks shall be constructed for treating the waste water from the camps.
g. Using bushes to visually screen the line crossing and maintaining shaded stream areas, where possible.
h. Prohibiting construction and maintenance vehicles from driving in waterways.
i. A detailed EMP should be compiled by the contractor, outlining site specific measures to be implemented to minimize impacts on surface water.

3.3.6 Solid Waste

28. Two types of wastes will be generated during the construction phase including debris and domestic refuse from construction camps. Earthwork can produce large amounts of soil and unmanaged domestic waste and litter can create unhygienic conditions for workers and communities in the vicinity. No solid waste should be generated during the operation except for electric components, cable pieces etc. from the regular maintenance and repair work.

29. **Recommendations:** To minimize the potential of unhygienic and unscenic sights in and around construction area, the following mitigation measures are recommended:
    j. Any spoil generated by the construction activities should be disposed of at an approved location. For the temporary storage of excavated earth should be done in a manner to avoid any inconvenience to the daily activities of the community.
    k. Littering should be prevented by providing adequate number of containers which shall be emptied on regular basis.
    l. Domestic waste should be collected and disposed of in an appropriate manner.
    m. After completion of construction the site shall be properly cleaned of any construction waster, litter etc. and properly rehabilitated or re-vegetated.
    n. Small amounts of discarded material during maintenance work should be disposed of as per the workplace guidelines.

3.3.7 Air Quality

30. During construction, air quality is likely to be degraded by exhaust emissions from the operation of construction machinery; and dust generated from earth works, approach roads, exposed soils and material stock piles. Air quality is not impacted by any activity during operations. The air pollution will be limited to construction phase and will be short-term and of low impact.

31. **Recommendations:** In order to mitigate the negative impacts on air quality, the following shall be implemented:

o. Construction equipment shall be maintained to a good standard and idling of engines discouraged.
p. Machinery causing excessive pollution (e.g., visible smoke) shall be banned from construction sites.
q. Spray water on access roads if dust is being generated in location close to human settlement
r. Cover the loads, construction material with tarpaulins while being transported and while also cover the stock piles with tarpaulins.

3.3.8 Noise and Vibration

32. The noise and vibration sources for the transmission line are limited to construction phase only as operation of heavy machinery can generate high noise levels. Another major source of noise would be excavation work in mountainous terrain as explosives may be used for rock blasting. Strong vibrations produced from blasting and by compaction equipment can damage houses, other structures and in this case minor landslides of loose rocks from mountain slopes.

33. As the alignment passes through Kunduz, the inconvenience caused to the people of city due to the construction activities is potentially significant. A number of small villages and settlements are found along the route on the hilly terrain, these communities might be affected by rock blasting. Mitigation measures need to be carefully followed to reduce and avoid the inconvenience to the communities.

34. Corona, associated with all energized transmission lines, is the physical manifestation of energy loss, and can transform discharge energy into very small amounts of sound, radio noise, heat, and chemical reactions of the air components. Transmission lines can generate a small amount of sound energy during corona activity but are not an issue for power lines rated at 230 kV and lower. The other types of noise are sizzles, crackles, or hissing noises that occur during periods of high humidity and are usually associated with high-voltage transmission lines (345 kV lines). As the proposed project line is only 220 kV problems related to corona and noise will be negligible. Also, maintaining the ROW along the transmission line will minimize any effect on humans.

35. **Recommendations:** In order to avoid any significant disturbance due to noise and vibration, to local communities during construction, the following shall be implemented:
    a. Work hours should be decided in consultation with local community and should avoid Prayer times.
    b. Work will be restricted to specific hours within 500m of settlements and 150m from sensitive receptors (schools, hospitals and places of religious importance).
    c. Blasting will be carried out only with permission of NEPA, using a pre-established schedule. All the statutory laws, regulation, rules etc., pertaining to acquisition, transport, storage, handling and use of explosives will be strictly followed.
    d. Blasting shall preferably take place during mid-day hours and the timing shall be made available to the local people within 500m of the blasting site in all directions, depending on the total charge used.
    e. Where ever possible and if required, blasting mats can be used to reduce noise levels when blasting is carried out.

3.3.9 Mines

36. Afghanistan is one of the heaviest mined countries in the world. In spite of years of intensive mine clearance hundreds of kilometers remain to be cleared. Information provided by the Afghanistan Information Management Service (AIMS) shows that Kunduz has numerous areas scattered with landmines and many UXO clearance operations are currently ongoing. The area between Kunduz and Taloqan (GPS point 8 and 9) is suspected to be contaminated. According to the DABS authority in Kunduz, this 40km stretch is potentially dangerous as it is UXO and Land mined area and also has security issues.

37. Special assessment and clearance will be needed for this area from UNMACA before initiation of any project activity. (Annex C)

Source: NEPS 220KV Transmission line (Kunduz –Taloqan) Land acquisition and Resettlement – Route Survey and GPS point, Environmental and Social Safeguard Report by SMEC International.

3.3.10 Polychlorinated Biphenyls

38. Historically most transformers and capacitors used a dielectric fluid based on polychlorinated biphenyls (PCBs). These products, although having fire-resistant and other properties required for use in electrical equipment, are also very toxic. Exposure to PCBs can result in organ failure and they are carcinogenic. They are also a very stable, non-biodegradable compound which persists in the environment for many decades. The environmental and health risks associated with their use resulted in their phasing out and removal from electrical equipments.

39. The proposed project involves construction of new transmission lines and it is recommended not to reuse any of the old PCB contaminated material. Also, the new products used for the transmission lines should be PCB free.

3.3.11 Electric and Magnetic Fields

40. A number of studies have been undertaken since the 1970's to determine if EMF from power lines poses any risk to health no conclusive evidence has been found and no international standards developed for defining health risks from EMFs. Effects of EMF during the operational stage as interference with radio, television signals and generating corona and stray voltage are discussed in other sections.

41. The size of the magnetic field cannot be predicted from the line voltage but is related to the current flow. Magnetic fields quickly dissipate with distance from the transmission line. Also, magnetic fields generated by double-circuit lines are less than those generated by single-circuit lines because the magnetic fields interact and produce a lower total magnetic field. In addition, double circuit poles are often taller resulting in less of a magnetic field at ground level. The project has 220kV double-circuit line and hence the EMF effect will of less significance.

42. **Recommendations:** Following are some measures to reduce the impact of EMF:
    f. Where possible maximize the distance between transmission lines and human settlement.
    g. Bring the lines closer together causing the fields of the conductors to interfere and produce a reduced total magnetic field.
    h. Security measures such as installing fences around the towers and placement of warning signs is recommended.
    i. For ensuring the health and safety of the workers adequate training in operation and maintenance of facilities and safety equipments shall be provided.

3.3.12 Agricultural Land

43. Transmission lines can affect farm operations and increase costs for the farm operator. Potential impacts depend on the transmission line design and the type of farming. Transmission lines can affect field operations, irrigation, aerial spraying, wind breaks, and future land development. Tower placement in farm fields can:
    s. Create problems for turning field machinery and maintaining efficient fieldwork patterns
    t. Create opportunities for weed encroachment
    u. Compact soils and change drainage pattern
    v. Result in safety hazards due to pole and guy wire placement
    w. Interfere with moving irrigation equipment
    x. Hinder future consolidation of farm fields or subdividing land for residential development
    y. Increase erosion of soils, if the windbreaks along field edges or between fields must be removed.

44. Much of the proposed transmission route passes through agricultural land the impact of transmission line on farming practices can be significant if mitigation measures and farmers involvement is neglected.

45. **Recommendations:** Following are some measures to reduce the impact on farming practices and farmlands:
    z. The contractor should work with agricultural landowners to determine optimal tower heights, pole locations, and other significant land use issues.

aa. Problems with pole placement can be addressed by using single-pole structures and placing the line along fence lines or adjacent to roads. If the structure is not single-pole, it should be oriented with the plowing pattern.
bb. If a field must be crossed, larger structures with longer spans can be used to span them.
cc. Guy wires can be kept outside crop or hay land and have highly visible shield guards.
dd. In areas where aerial spraying and seeding are common, pole height can be minimized and markers on the shield wires above the conductors can be installed.
ee. The potential for soil compaction and erosion by transmission construction and maintenance activities can be lessened. Work in agricultural areas can be performed during the winter months and when soils are not saturated. If compaction has occurred, affected soils can be chisel plowed over successive seasons as needed to break up compacted layers.
ff. The effects of windbreak removal can be mitigated by trimming the windbreak vegetation selectively, replanting lower-growing trees and brushes beneath the line, or creating a new windbreak elsewhere.

3.3.13 Airports and Airstrips

46. The current transmission line route in south of Kunduz city is located near the Airport. Transmission lines are a potential hazard to aircraft during takeoff and landing. The exact location and distance from the air strip will be determined during the detailed design phase but the following mitigation measures can be applied.

47. **Recommendations:**
    gg. The route of the transmission line must be outside the obstacle imitiation surface restrictions
    hh. Special low-profile structures can be used.
    ii. Lights or other attention-getting devices on the conductors can be placed.

3.3.14 Lightning

48. Power poles, like trees and other tall objects are more likely to intercept lightning strikes. Transmission lines are therefore usually built with a grounded shield wire at the top of the poles. This protects the transmission line from lightning. Lightning is not more likely to strike houses or cars near the transmission line. Shorter objects under or very near a line may actually receive some protection from lightning.

3.3.15 Buildings

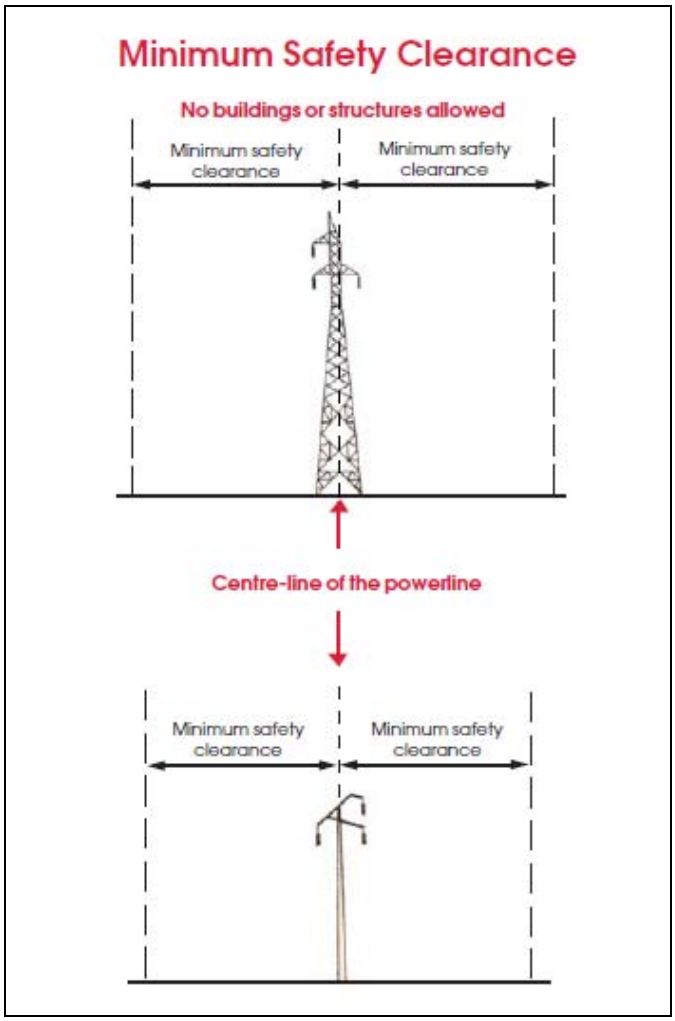
49. Electricity should always be treated with respect, especially when working near transmission lines, such as when building or extending. The transmission line route passes through the Kunduz city through residential and commercial area and villages between Kunduz and Taloqan. Enough space between the buildings and transmission lines need to be ensured where possible to minimize the risk of electric shock, fire, power cuts or damage to property and transmission lines, both in present and in the future.

50. The minimum safe clearance or ROW varies from country to country. Following are the building safety guidelines from Government of South Australia. DABS might want to develop such ROW maintenance or Transmission line Safety guidelines to increase public awareness and help safe development in future.

51. It is recommended that special technical approval shall be sought in cases where exiting buildings are falling within the ROW. This case might arise in the around the city of Kunduz.

Figure 5. Minimum safe clearance for buildings or structures

Powerline Voltage	Minimum Horizontal Clearance Distance *Metres either side of powerline*
275 kV	25 metres
132 kV (except single pole lines)	20 metres
132 kV (single pole lines)	15 metres



Source: Government of South Australia

Figure 6. Minimum clearance in meters from the closest conductor in worst conditions

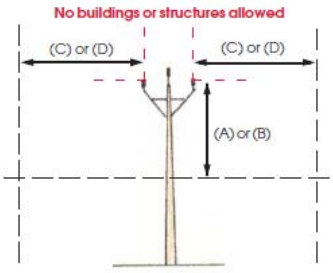
Voltage	Up to and including 1 kV			Above 1 kV		Above 1 kV up to and including 33 kV	66 kV
Type	Insulated	Bare		Insulated		Bare or Covered	
		neutral	active	with earthed screen	without earthed screen		
Dimension A *Vertically above those parts of a building or structure normally accessible to persons*	2.7	2.7	3.7	2.7	3.7	5.5	6.7
Dimension B *Vertically above those parts of a building or structure not normally accessible to persons but on which a person can stand.*	0.1	2.7	2.7	0.1	2.7	4.7	5.5
Dimension C *In horizontal direction from those parts of a building or structure normally accessible to persons, or that is not normally accessible to persons but on which a person can stand.*	0.1	0.9	1.5	0.1	1.5	3.1	5.5
Dimension D *In horizontal direction from those parts of a building or structure not normally accessible to persons.*	0.1	0.3	0.6	0.1	0.6	2.5	4.5

Vertical dimension (A) applies, for example, to:
- Balconies
- Terraces
- Walkways
- Bridges
- Scaffolds

Vertical dimension (B) applies in relation to things such as:
- Roofs with a slope of less than 45°
- Parapets wider than 0.1 metre
- Pergolas
- Carports

Horizontal dimension (C) applies to the same as (A) and (B).

Horizontal dimension (D) applies in relation to things such as:
- Roofs with a slope of 45° or more
- Flag poles
- Light poles



Source: Government of South Australia

3.2 Ecological Environment

3.4.1 Flora

52. The potential impact of the proposed transmission line anticipated include:
    a. Removal of vegetation from the tower footprint
    b. Loss of rare, endangered and/or protected species (No detailed ecological survey has been carried out, although the probability is very low, the potential occurrence of such species cannot be ruled out)
    c. Disturbance of natural vegetation along access roads through trampling, compaction by vehicles, noise and air pollution etc.
    d. Establishment and spread of invasive species from re-vegetation of disturbed area
    e. Trimming of trees in ROW during the operational stage (or removed only in unavoidable circumstances) to maintain a minimum vertical safe clearance between the conductors and trees.

53. Although majority of these impacts are likely to occur, they will be localized and not significant. Also, no forests or protected areas are located near the Project site. Through implementation of mitigation measures, the impacts can be effectively removed or minimized.

54. Recommendations:

j. Construction activities for towers should be restricted to the minimum area needed
k. Measures should be implemented to prevent spillage of concrete or other substances that can permanently destroy vegetation
l. Removal of all excavated material and construction rubble after construction is complete
m. Distribution networks shall be aligned along existing corridors, Use existing access roads and minimize construction of new access roads
n. Movement of construction vehicles soon after heavy rains should be avoided till the surface has dried
o. After completion of construction, all access roads which will not be used in future should be rehabilitated and re-vegetated
p. Construction around trees shall be performed carefully to avoid the damage of tree "drip-line".
q. Workers shall be trained in correct techniques of tree trimming without damage to the trunk or roots.
r. Spread of invasive species should be monitored, reported and addressed appropriately.

3.4.2 Fauna and Avifauna

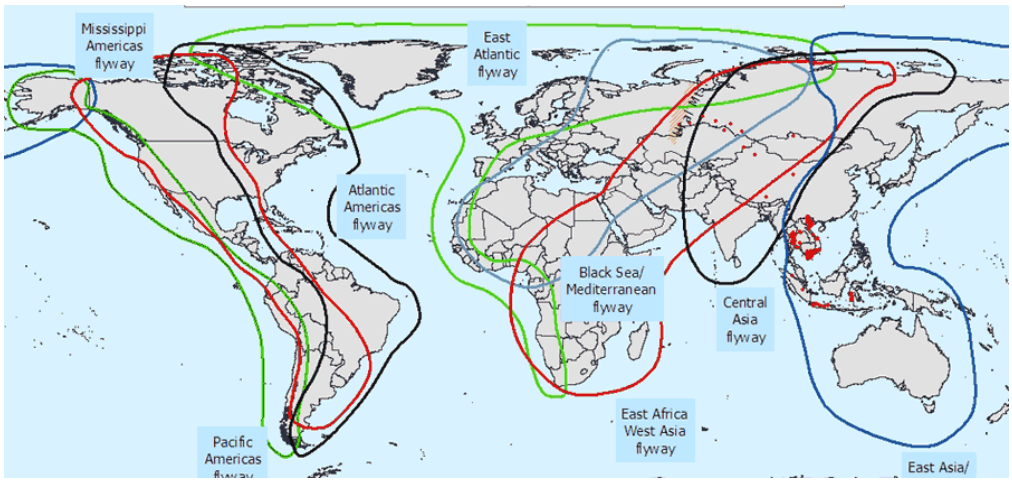
55. Electrical infrastructure, due to its size and prominence, constitutes an important interface between wildlife and man. Birds are the most affected from the transmission lines. The transmission line runs for around 70km over variety of ecosystems including urban areas, agricultural land, river and streams, desert, valley and hills. Afghanistan has some 441 bird species including some migratory waterfowls. Migratory birds fly through Northern Afghanistan to reach southern provinces and countries. Based on the flyway paths available with international organizations and in absence of any site specific information, it is deduced that Thakar and Kunduz province do not fall in Central-Asian Flyway of migratory birds.

56. As the route also passes through fertile agriculture land and perennial rivers, some of the project area will have bird populations hence the potential for impact on birds. Following are some of the transmission line impacts on birds:

a. Electrocutions: birds attempt to perch on the electrical structures and causes and electrical short circuit by physically bridging the air gap between live wires. Large birds are the most commonly electrocuted birds on powerlines but the large transmission line structures (220 – 765 kV) are usually not a threat to large birds as the towers are designed in such a manner that the birds do not perch in close proximity to potentially lethal conductors. As the proposed line of 220 kV the tower designs will help reduce the electrocution possibilities.
b. Nesting: Many species utilize towers as nesting substrates and so the project is anticipated to have a positive impact on the avifauna in the area
c. Collisions with overhead wires: Large terrestrial birds, especially slow fliers and which have limited maneuverability are more susceptible for collision with the wires of transmission line. The collision of birds with proposed transmission line ,may occur on plains, flats and places where transmission line runs close to water bodies.

d. Habitat destruction: during construction phase and maintenance of transmission lines, some habitat destruction and alteration will take place. This happens with construction of access roads and trimming of trees in ROW.
e. Disturbances during construction and maintenance.

Figure 7. Major flyways of migratory birds



Source: Wetlands International

57. **Recommendations:** In order to reduce some of the above mentioned impacts, the following measures may be followed:
    f. Placing markers on the top wire to make the wires more visible to birds in areas where the collision potential is high.
    g. All construction and maintenance activities in any natural habitat along the route should be conducted in accordance with best environmental practices to cause minimum disturbance to any habitat
    h. Where possible the location of the poles/towers should be chosen so as to avoid the cutting of large trees.

3.4.3 Protected Area and Land Use

58. There are no protected areas in the project site. The land use adjacent to the transmission line will change in long term due to the ROW management and access road construction. The impact due to change in land use is insignificant..

3.3 Socioeconomic Environment

3.5.1 Compensation Plan

59. The current route might require some land acquisition in and around Kunduz city and around smaller villages along the route. The minor land acquisitions will be for tower footing, ROW and access roads. In addition, there will be some temporary disturbances in terms of accessibility, damage of local access roads and setting up temporary work sites. Minor encroachment of private lands may be required for temporary access roads, particularly for construction of new poles and towers.

60. Land acquisition will be minimized through avoiding the proximity to existing settlements and buildings and minimizing the need to acquire agricultural land during the detail design stage. The project has ensured that impacts are minimized through careful route selection to avoid towers on farmland wherever possible and making use of existing tower footings and access roads. Inside the Kunduz city, the existing utility corridor will be used and to reduce the footprint, poles will be used instead of towers. The footprint is expected to be only $2m^2$. Minor encroachment into farmland along some sections of the transmission line, due to the location of towers and temporary access roads, is unavoidable. Farmers will be able to use agricultural land along the transmission line right of way (ROW).

61. The compensation plan and policy guideline will be formulated by the PIU in cooperation with the Consultant following the ADB guidelines and will be disclosed to the local community. Compensation will be paid for any loss of trees and temporary and permanent loss of agricultural production during project implementation, in accordance with the compensation policy.

3.5.2 Employment Opportunities

62. Due to the specialized nature of the work to be undertaken during the construction of transmission line, it is not anticipated that many employment opportunities will occur, as the local communities will not posses the skills required for such specialized work. For manual labour and non-technical work, the contractor will be required to hire local people and wherever possible provide the training and use the local manpower.

3.5.3 Resource Use

63. Construction sites may place stresses on resources and infrastructure of nearby communities. The project duration is not very long and hence these stresses will be temporary and negligible. But contractor will be responsible and should work to avoid any conflict between residents and workers. It is advised to use of the local labor during the construction which will increase benefits to the local community and resolve such conflicts.

3.5.4 Daily living and Movement Patterns

64. The traffic in Kunduz city may face temporary problems due to the excavation and construction processes of pole installation which will in existing utility corridor, along the road sides. The access to shops and houses near such construction sites will also be hampered temporarily. The contractor will be required to maintain access and cover exposed soil during wind to prevent dust. These measures shall provide some relief to people in the vicinity. In addition the contractor will ensure that any excavated material is placed off the road wherever possible, to limit the width restriction.

65. The rest of the route passes through sparsely populated region and will have minor effect on daily living and movement pattern of local communities. The route towards Taloqan runs close to the Taloqan-Kunduz main road, the construction activities might cause temporary problems for vehicular traffic on this road.

66. Maintenance and inspection of the line will have not have any significant impacts on the communities.

3.5.5 Health, Safety and Hygiene

67. Construction sites are likely to have public health impacts and to reduce any such impact contractors shall ensure that wastewater and solid waste are disposed of as per the guidelines above. There might be a potential for diseases and accidents due to inappropriate of health and safety practices on site and hence contractor shall be required to recruit a, health and safety manager during the construction phase.

68. Following are some of the mitigation measure that shall be implemented by the contractor:

    a. Provision of adequate healthcare, first-aid facilities at construction sites
    b. Training all construction workers in basic sanitation and healthcare issues (e.g., how to avoid transmission of sexually transmitted diseases such as HIV/AIDS), general health and safety matters, and on the specific hazards of their work
    c. Providing personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection;
    d. Providing clean drinking water to all workers;
    e. Providing protection to the general public, including safety barriers and marking of hazardous areas;
    f. Provide safe access across the construction site to people whose settlements and access are temporarily severed by the construction;
    g. Ensuring drainage throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form; and
    h. Provide garbage boxes and septic tank at construction site, which will be periodically cleared by the contractors to prevent outbreak of diseases.
    i. Activities like using heavy machinery and/or hammers for digging pole holes, installation of cable etc. can cause accidents if not managed properly. Proper training, instruction and supervision is required to ensure workforce safety during construction activities.

69. The health risks associated with EMFs are discussed in section above. The best way to avoid any such effect is by maintaining a safe ROW throughout the route. Also, the tower footings should be fenced and warning boards in local language places on sites to restrict the access near towers and avoid any accidents.

3.5.6 Socioeconomic Benefits

70. Much of the economic growth in Afghanistan is hampered by inadequate electricity supply. The project contributes to meeting the commercial and residential electricity requirement of Northern region. The implementation of this project ensures improved living conditions in terms of social and economic aspects for both the towns.

71. During the construction phase and later on the operation phase the project will generate some employment opportunities for the local populations. The property prices of land in proximity of the tower footing or having visual intrusion of cables might decrease. The impact of reduced property value might be greatest for residents in Kunduz city and for farmers on who's land the tower might be located.

3.5.7 Public awareness

72. People in the region might be unaware of health and safety issues related to high tension wires. As the transmission line route passes through densely populated area of Kundus city and other villages along the route, it is highly recommended to generate awareness through community meetings, leaflets, media etc. Special sessions should be conducted with farmers which will be working in and around towers and ROW and residents with houses close to ROW.

5. Institutional Requirement and Environmental Monitoring Plan

4.1 Environmental Clearance Requirements

13. In accordance with ADB's Guidelines1 and Environmental Requirements of TA and loan processing, an Initial Environmental Examination and Summary Initial Environmental Examination (SIEE) will be presented to both the Government of Afghanistan and ADB Management.

4.1.1 Government Environmental Laws, Regulations and Guidelines

14. The Government's regulation on environmental impact assessment is based on the Environmental Act of Islamic Republic of Afghanistan (Gazette No. 873), dated 29 Jadi, 1384 (19 January, 2006). The National Environmental Protection Agency (NEPA), as an independent institutional entity, is responsible for coordinating and monitoring conservation and rehabilitation of the environment, and for implementing this act. Article 16 and 17 of Chapter 3 of Environmental Act describes the process of preparing a preliminary assessment, an environmental impact statement and a comprehensive mitigation plan to be conducted by the proponent of each project. Article 21 mentions public consultation is required for all the projects. Article 18 describes the approval procedure of environmental impact assessment. The NEPA will appoint an EIA Board of Experts to review, assess and consider applications and documents submitted by the proponent. Acting on the advice of the EIA Board of Experts, NEPA shall either grant or refuse to a grant permit in respect of the project. A permit granted will lapse in the event that the proponent fails to implement the project within three years of the date of which the permit was granted. Article 19 describes the appeal procedure. Any person may within thirty days of the granting or refusal of a permit, appeal the decision to the Director-General of the NEPA. The Director-General shall review the appeal application and thereafter make an appropriate decision. Should the appellant wish to appeal the Director-General's final decision, the matter shall be referred to the relevant court.

15. Chapter 6 of the Environmental Act of the government describes national biodiversity strategy and protected areas management. The NEPA will prepare a national biodiversity strategy and action plan within two years of the entry into force of the Environmental Act. The NEPA will also develop a comprehensive plan for the national protected areas system.

4.1.2 Institutional framework for Environmental Management

16. In March 2008 the Government of Afghanistan approved the formation of Da Afghanistan Breshna Sherkat (DABS) as part of a strategy to commercialize the power sector. DABS will be the executing agency for the project. DABS will be responsible for ensuring that the Project is implemented in an environmentally acceptable manner in accordance with the Environmental Management and Monitoring Plan (EMMP). Since DABS has limited environmental capacity, designated staff members will be trained in environmental

[1] Environmental Assessment Guidelines, Asian Development Bank, 2003.

management and monitoring of transmission lines. An international (1.5 person-months) and a local (3.0 person-months) environmental specialist have been included in the Supporting TA project implementation consultant's team to train DABS staff members in environmental management, establish routine environmental monitoring protocols, and undertake periodic environmental monitoring and audit of construction works during construction.

17. DABS will implement and monitor the submission and clearance of IEEs and EIAs under statutory provisions. It will ensure that bidding documents and contracts include the mitigation measures required in the EMPs and that the mitigation measures are implemented by the contractors. The Investment Program requires the establishment of an environmental cell within DABS, and the appointment of environmental and resettlement specialists

18. After project completion, DABS will be in charge of the operation and maintenance of the transmission lines. PIU in cooperation with the district/regional administration will undertake the monitoring and analysis of samples as scheduled in the monitoring plan.

4.2 Environmental Monitoring Program

19. Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the protection of environment. Compliance monitoring will be conducted in accordance with the EMMP provided with this report. Aspects to be monitored are as follows:
    - Pre-construction: updating of EMMP during detailed design phase and inclusion of environmental clauses in bid and contract documents.
    - Construction: environmental performance of contractors with regard to control measures to pertaining to erosion, material storage, sitting of work site, noise, waste disposal, traffic management, worker's safety etc.
    - Operation: O & M practices and environmental effects including soil erosion, soil contamination, surface water and EMFs.

20. The CSC in cooperation with PIU during project implementation will be required to develop an environmental auditing protocol for the construction period, formulate a detailed monitoring and management plan, supervise the environmental monitoring regularly and submit quarterly reports based on the monitoring data and laboratory analysis. The PIU shall submit the following environmental reporting documentation to ADB:

21. *Baseline Monitoring Report*: As it has not been possible for extensive surveys to be undertaken for the preparation of the IEE some ground truthing will be required prior to the start of construction. This will ensure that all environmental issues are covered in the EMMP and that there will be no unexpected environmental impacts. This assessment will take the form of a baseline monitoring report. The Baseline Monitoring Report shall be submitted to ADB prior to commencement of civil work and will include a detailed environmental management and monitoring plan (including data collection locations, parameters and frequency), baseline environmental data, relevant standards and data collection responsibilities. A recommended format for environmental performance and effects monitoring for pre-construction, construction and operation phases is presented in Annex D.

a) *Environmental Monitoring Reports:* The environmental monitoring reports will include environmental mitigation measures undertaken, environmental monitoring activities undertaken, details of monitoring data collected, analysis of monitoring results, recommended mitigation measures, environmental training conducted, and environmental regulatory violations. The environmental monitoring reports will be submitted to ADB twice annually during the construction period and annually for three years after completion of construction.
b) *Project Completion Environmental Monitoring Report:* Three years after completion of construction, the EA shall submit a Project Completion Environmental Monitoring Report to ADB which will summarize the overall environmental impacts from the project.

76. A lump sum budget is allocated in the environmental mitigation to cover monitoring cost and environmental reporting requirements in the project (Table 3). PIU will hire a recognized organization for environmental monitoring and ensure that the project sites (substations, transformers, pole line) are monitored regularly for the first two years of its operation.

4.3 Environmental and Social Management Training

76. The DABS has very limited experience and resources for environmental and social management and monitoring. It will be very difficult for PIU to efficiently supervise the monitoring of environmental and social safeguard parameters. For a better understanding of transmission line related environmental issues, implementation of mitigation measures and subsequent monitoring, capacity building of PIU and regional administration is advised. Training for the officials is crucial for proper environmental monitoring addressed in the IEE. The contractor shall be provided hands-on-training in the construction site by the CSC in association with the contractor's environmental, health and safety manager. These training efforts should be extended to aid civil society capacity building, enabling local NGOs to become actively involved and qualified to conduct own environmental audits.

Table 3. Environmental monitoring and mitigation cost

Item	Unit	Quantity	Unit Cost (USD)	Total (USD)
Environmental Costs - Civil Works (included in Contractors civil work package)				
Soil erosion	No	15	500	7,500
Surface water Contamination and drainage/regime pattern	Site	15	500	7,500
Noise, Vibration and EMFs	Site	15	1,000	15,000
Human health, safety and hygiene	Site	15	500	7,500
Flora and Fauna	Site	15	200	3,000
Dust Suppression Measures	Day	365	200	73,000
Provision of Health, Safety and Environmental Manager	MM	12	3,000	36,000
			Subtotal	149,500
Environmental Costs - Project Implementation Unit (PIU) Budget				
Environmental Management and Monitoring (during design and construction)				
a. Remuneration and Per diems				
International Environmental Specialist (design)	MM	1	18,000	18,000
International Environmental Specialist (CS)	MM	2	18,000	36,000
Domestic Environmental Specialist (design)	MM	3	3,500	10,500
Domestic Environmental Specialist (CS)	MM	12	3,000	36,000
b. Travel				
International Travel	Trip	3	2,500	7,500
Domestic Travel	No	6	500	3,000
			Subtotal	111,000
Environmental Monitoring of Project (during operation for 3 years)				
Soil erosion	No	15	500	7,500
Surface water Contamination and drainage/regime pattern	Site	15	500	7,500
Noise, Vibration and EMFs	Site	15	1,000	15,000
Human health and safety	Site	15	500	7,500
Flora and Funa	Site	15	200	3,000
Environmental Monitoring Reports (construction & ops)	No	6	1,000	6,000
Project Completion Environmental Monitoring Reports	No	1	1,500	1,500
			Subtotal	48,000
Environmental and Social Management Training				
a. Remuneration and Per diems				
International Environmental Specialist	MM	1	21,000	21,000
International Social/Resettlement Specialist	MM	1	21,000	21,000
Domestic Environmental/Curriculum Specialist	MM	2	3,500	7,000
Domestic Social/Resettlement Specialist	MM	2	3,500	7,000
b. International Travel	Trip	2	2,500	5,000
c. Trainees Allowance	Person	9	180	1,620
d. Logistics and Others	No	9	500	4,500
			Subtotal	67,120
			Total (PIU)	375,620
			15% overheads	56,343
			Grand Total	**431,963**

Note: 1. Construction Period assumed to be one year

2. Monitoring in construction phase to be done on monthly basis

3. Inspection in monitoring phase to be done quarterly for 3 years

6. Stakeholder Consultation and Information Disclosure

77. After some thirty years of war Afghanistan is attempting to rebuild itself, but on-going, sporadic conflict makes operating in the country difficult for security reasons. It is not possible to conduct effective community consultation under the current security situation. In order to ensure that affected persons have some involvement during the construction process the contractor is required to undertake consultation with affected communities prior to beginning work. As the level of impacts associated with this sub-project are localized and relatively minor it should be possible for the contractor and PIU to deal with each individual landowner/householder. The following outline may be followed:
    a. Conducting a community meeting wherein people from all the nearby villages are invited. In the case of Kunduz town all affected householders will be visited individually. The meeting shall be arranged by the contractor and the CSC, domestic environmental and social expert, and other PIU members shall be present.
    b. The meeting shall help in knowing the community concerns and the response or the way these concerns will be addressed during construction and operational phase shall be communicated. The IEE report may be used as the reference wherein the EMMP have been prepared to address the environmental and social concerns.
    c. The contractor and/or CSC shall be available throughout the project period for grievance reporting. The grievance may be redressed by them and in special cases the domestic social expert shall be called in for help.

78. .A grant Pre-Appraisal Mission of ADB was held during the 5-13 August 2008 at the Inslamic Republic of Afganistan and discussions were held with officials from MEW, MOM, MOE, MOF, USAID, DABS and local government officials from Kunduz and Taloqan Province.. The mission shared the scope of the project and ADB's commitment to the government, and all the representatives welcomed the proposed project and gave there commitment to fully support the project once started. The mission shared the information about the process involved from design to construction and links to import of power from neighbouring countries.
79. The August 2008 mission was able to arrange a meeting with the community leaders of Khanabad where the project was presented and the participants shared their views with the project team. There was overwhelming support for the project but concerns about the time taken to build the line were expressed. A certain cautiousness also prevailed as a number of other development projects in the area had failed to be completed or had failed to deliver the expected improvements.

7. Findings and Recommendations

80. The present IEE reveals that some moderate to significant negative environmental impacts are likely to occur due to the construction activities and few minor impacts during the normal operations after the proposed construction and rehabilitation. Recommendations are made to mitigate expected negative impacts.

81. Construction of transmission line will generate a number of negative impacts on the environment. The major impact being land acquisition and permanent resettlement along the transmission line route for construction of towers, maintaining ROW and access roads. This impact needs to be mitigated at the planning and detail design stage, while taking the local community in confidence. Transmission line can also have unavoidable, irreversible and long term impacts like visual intrusion, safety concerns, change in land use patterns and bird strikes. Following the mitigation measures during planning, construction and maintenance stage can minimise these impacts.

82. Many of the impacts during the construction period cannot be assessed at this moment, because sites for temporary work activities have not been identified and/or information concerning the period and the duration of these activities are not available. The temporary construction works could create more impacts than the activities related to the permanent works. For this reason, environmental management and monitoring will be required covering construction and operation stages and is estimated to cost around US$ 432,000. The budget includes environmental and social management training of Government officials which will enable them to carry out environmental monitoring, implement environmental management plans and conduct impact assessment.

83. The major positive impact of the project, which is also the reason behind proposing this project, is the increased access to electricity to the northern region of Afghanistan, an improved quality of life, reduced health risk by providing better indoor air quality, enhance the development of small to medium sized enterprises, and increased trade and economic flow in the region.

8. Conclusion

76. The Project will have some minor environmental impacts, which will be both positive and negative, including: (a) soil erosion, (b) temporary effect on noise and air quality due to construction activities, (c) visual intrusion and negative impact on aesthetics, (d) change in land use patterns, (e) increased bird collisions, (f) increased growth in the economy of the region, (g) better indoor air quality, (h) better life style and improved living conditions, (i) reduced health risk, (j) development of small to medium sized enterprises, (k) reduced poverty; and (l) advanced environmental skills and awareness level among the DABS officials.

77. Implementation of appropriate mitigation measures during the design, construction, and operation phases will minimize the negative impacts of the Project to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures will be included in the contract specification of the Project. Environmental monitoring of the Project will be undertaken regularly through the first three years of its operation to ensure that the measures are being implemented properly.

78. The Project will have an overall beneficial impact and any negative environmental impacts that will be carefully monitored and mitigated. Therefore, the completion of this IEE fully meets the ADB and government standards and no further environmental study is required for this Project.

Annex D: Environmental Management and Monitoring Plan

Management Plan

Sr. No.	Environmental Impact/Issue	Mitigation Measures	Reference in Document	Location	Responsibility	
					Implementation	**Supervision**
1	**Preconstruction Phase**					
1.1	Up-Dating of EMMP during Detailed Design for Sub-components	i. Updating of EMMP during detailed design phase and incorporation of mitigation measures in the project design ii. Allocating and revise budgets estimates for EMMP	IEE, Section 5	Entire project	PIU	DABS
1.2	Lack of Environmental Specifications for Contractor in Bid Documents, Environmental Clauses for Contracts	i. Prepare relevant environmental sections in the tender documents for bidders ii. Prepare a bid evaluations section for environment, according to ADB bid evaluation format iii. Prepare environmental contract clauses for contractors (refer to EMMP)	IEE, Section 5	Entire project	PIU	DABS
1.3	Interference with residences, historical, cultural, religious monuments, hospital, schools etc.	i. Use the existing utility corridor within the city ii. Wherever possible use the existing tower or tower footing iii. Finalize the work hours based on distance from residences, hospitals, schools and especially to avoid prayer times	IEE, Section 4	Locations near human settlements, especially Kunduz city	PIU	DABS

1.4	Farmland Encroachment	i. Use existing tower footings/towers wherever possible ii. Plan the route to avoid siting new towers on farmland wherever feasible iii. Use longer spans, place towers adjacent to roads or fences iv. Compensate farmers for any permanent loss of productive land v. compensate Farmers/landowners for significant trees that need to be trimmed/removed along ROW.	IEE, Section 4	Locations in agricultural zone	PIU	DABS
1.5	Interference with river flow and drainage pattern	i. Appropriate planning of route to avoid tower siting which may interfere with river flow ii. Placement of towers on the River banks and within 1:50 year flood lines should be avoided as far as possible ii. Use existing access roads and plan new ones to avid interference with drainage pattern, especially near the river.	IEE, Section 4	Locations near River and other surface water soruces	PIU	DABS
1.5	Airport, Airstrip and Buildings	i. Plan the route outside of the safety zone of airports ii. Refer local ordinances or aviation guidelines which limit the height of objects in the vicinity of the runways iii. Special low-profile structures can be used iv. Place lights or other attention-getting devices on the conductors v. Plan route to avoid proximity to buildings vi. Maintain ROW through out the route and in case of exceptions take special technical permission	IEE, Section 4	Location near Kunduz Airport, city and other villages on the route	PIU	DABS

1.6	Aesthetics (Visual intrusion, reduced aesthetics of natural landscape)	i. Route the line to avoid areas considered scenic. ii. Routes can be chosen that pass through commercial/industrial areas or along land use boundaries iii. The form, color, or texture of a line can be modified to minimize aesthetic impacts iv. Stronger conductors can minimize line sag v. ROW management can mitigate aesthetic impacts by planting vegetative screens to block views of the line	IEE, Section 4	Throughout the route	PIU	DABS
2	**Construction Phase**					
2.1	Physical Environment					
2.1.1	Soils and Geology (top soil erosion, erosion of material stockpile, damage of local roads)	i. Restrict the corridor width and unnecessary vegetation clearing ii. Areas disturbed during construction should be appropriately rehabilitated and, if necessary, re-vegetated. iii. Reuse the spoils, removed rocks and earth for tower fences, access roads etc. iii. Removal of contaminated soil from the site and conduct remediation measures iv. Cover the material stockpiles or store inside a covered area v. Repair the local roads post construction vi. Avoid construction in rainy season vii. Special measures for steep gradients in hilly area	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads, store house	Contractor	CSC

2.1.2	Surface water (increase in turbidity, pollution due to improper disposal of waste water, localized change in river flow and drainage patterns)	i. Measures to reduce soil erosion as mentioned above ii. Providing sanitary facilities to workers at campsite iii. Proper treatment or disposal of wastewater through septic tank iv. Cover up the smaller surface water bodies like wells, ponds etc. in the vicinity where used for drinking water vi. Where new access roads are to be constructed, they should not disturb the natural drainage patterns of the area vii. If the river is crossed, special attention should be given to prevent change in flow patterns viii. Prohibiting construction and maintenance vehicles from driving in waterways	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads especially near surface water sources like river, streams and ponds	Contractor	CSC
2.1.3	Solid Waste (construction debris, waste from construction camps)	i. Reuse the digged soil or rocks for providing side berms or fencing for poles, towers, access roads etc. ii. Dispose the unused material at specified site iii. Prevent littering by providing adequate number of containers iv. Domestic waste should be collected and disposed of in an appropriate manner at an approved site v. After completion of construction the site shall be properly cleaned of any construction waster, litter etc. and properly rehabilitated or vegetated	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads, worker camps	Contractor	CSC
2.1.4	Air Quality (Increased dust, pollution from exhaust)	i. Spray water at the construction site and on access road ii. Maintaining the construction vehicles and machinery iii. Ban the use of machinery causing excess	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC

		pollution				
2.1.5	Noise and Vibration(Construction activities, machinery and vehicles, Corona activity)	i. Restrict work hours in consultation with local community and avoid Prayer times ii. Restrict to specific hours within 500m of settlements and 150m from sensitive receptors (schools, hospitals and places of religious importance). iii. Blasting should take place during mid-day hours and the timing should be made available to the local people within 500m of the blasting site in all directions iv. A limit of 70dBA shall be set in the close vicinity of the construction site v. If required, use blasting mats to reduce noise levels during blasting vi. At places with noise violation within the city, mitigation measures such as earth berm, dense layered plantation and other measures like wooden noise barriers shall be considered	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC
2.1.6	Mines (Landmines spread over 40km between Kunduz and Taloqan)	i. Demine the proposed transmission line alignment before starting any construction work ii. Special assessment and clearance will be needed for this area from UNMACA before initiation of any project activity.	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC
2.1.7	EMFs (Interference with radio, television signals, generating corona and stray voltage, interfere with cardiac-pacemaker)	i. Keep the safety offset, ROW, between buildings and transmission line ii. Provide safety gears to workers working in high voltage area iii. Construction the lines closer so as to reduce the EMF	Contract Documents and IEE, Section 4	Transmission line towers and along the route	Contractor	CSC

2.1.8	Agricultural land (Negative effect on farming practices like maneuvering of machines, soil compaction/erosion, weed encroachment, safety hazard)	i. Use single-pole structures and place the line along fence lines or adjacent to roads. ii. Keep guy wires can be outside crop or hay land and have highly visible shield guards. iii. minimize pole height and install markers on the shield wires above the conductors iv. Conduct work in agricultural areas during the winter months and when soils are not saturated v. Replanting lower-growing trees and brushes beneath the line or create a new windbreakers	Contract Documents and IEE, Section 4	Transmission line towers and along the route through agricultural lands	Contractor	CSC
2.2	Ecological Environment					
2.2.1	Flora (clearing of vegetation for tower footing, disturbance near access roads, trimming the tree branches along ROW)	i. Restrict the uprooting of vegetation near tower footings and access road. ii. Train worker in correct techniques of tree trimming without damage to the trunk or roots iii. Minimize the construction activity area and implement measures to prevent spillage of concrete or other substances that can permanently destroy vegetation iv. Restrict the movement of construction vehicles soon after heavy rains v. Rehabilitate and re-vegetated the affected land	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC
2.2.2	Fauna (destruction/interference with habitat, disturbing individuals, bird-strike, increased probability of electric shock, effects from stray voltage, poaching by workers)	i. Reduce interference by restricting corridor width, removal of vegetation and trimming of trees ii. Providing fencing around the high voltage areas iii. Educate workers about wildlife conservation and conduct the work while following the best environmental practices iv. Place markers on the top wire to make the wires more visible to birds in areas where the collision potential is high	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC

2.3	Socioeconomic Environment					
2.3.1	Compensation Plan (Land acquisition, rehabilitation, temporary acquisition)	i. Follow the RAP ii. temporary acquisition should be done only after taking owner's permission ii. Cause least damage to property and rehabilitate the site after completion of work	Contract Documents and IEE, Section 4	Transmission tower locations, ROW, access roads	Contractor	CSC
2.3.2	Employment opportunity and Resource use (increase employment opportunity and stress on resources)	i. Train and hire local workers as far as possible	Contract Documents and IEE, Section 4	Entire Project	Contractor	CSC
2.3.3	Residential proximity, movement and living patterns (access impediment to buildings, increased dust, road congestion, signal interference)	i. Provide temporary bridges to maintain access ii. Cover exposed soil ii. Clear the earth removed from foundation pit to limit the width restriction iii. Transfer the material during non-peak hours of traffic iv. Restrict working hours v. Maintain ROW	Contract Documents and IEE, Section 4	Route near human settlement especially Kunduz city	Contractor	CSC
2.3.4	Health Safety and Hygiene (Health, safety and hygiene of workers and work space, Health and Safety of people living near the transmission line)	i. Mitigation for workers safety and health are mentioned in detail in the IEE Report including the provision of safety gears for workers ii. Provide earthing to all the metallic equipments near the transmission line ii. Appropriate distance shall be maintained between the transmission line and buildings. Iii. No encroachment shall be allowed in ROW	Contract Documents and IEE, Section 4	Entire Project	Contractor	CSC
2.3.5	Public Awareness (Increase through various consultation and educational programme)	i. Conduct community meetings, distribute information leaflets, educational advertisements in media etc. ii. Special sessions with farmers which will be working in and around towers and ROW and residents with houses close to ROW	Contract Documents and IEE, Section 4	Residents, Farmers & everyone in general	Contractor	CSC
3	**Operational Phase**					

3.1	Physical Environment					
3.1.1	Soil (soil erosion due to maintenance and use of access roads)	i. Restrict vehicle speed	IEE, Section 4	Access roads	PIU-consultant	PIU
3.1.2	Surface Water (silt in runoff, change in drainage pattern, scouring of river bed near tower footings)	i. Prohibit maintenance vehicles from driving in waterways ii. Address the scoring if considerable	IEE, Section 4	Route near river and other surface water sources	PIU-consultant	PIU
3.1.4	Noise and Vibration (Corona noise in high voltage area)	i. The proposed project lines are lower than 230 kV, problems related to corona, including sound, will be negligible ii. Provide safety gear to officers working in plant iii. Maintain ROW and restrict access to tower footings	IEE, Section 4	Towers	PIU-consultant	PIU
3.1.6	EMFs	i. Keep the safety offset, ROW, between buildings and transmission line ii. Provide safety gears to officers working in high voltage area iii. Restrict access near towers by fencing and warning signs	IEE, Section 4	Towers and cables	PIU-consultant	PIU
3.2	Ecological Environment					
3.2.1	Flora (Regular trimming of trees in ROW)	i. Train worker in correct techniques of tree trimming without damage to the trunk or roots	IEE, Section 4	Entire route	PIU-consultant	PIU
3.2.2	Fauna(Bird-strike, electric shock to wildlife)	i. Providing fencing around the high voltage areas ii. Place markers on the top wire to make the wires more visible to birds in areas where the collision potential is high	IEE, Section 4	Entire route, especially near water sources	PIU-consultant	PIU
3.3	Socioeconomic Environment					

3.3.1	Health, Safety and Hygiene (officers working during the operation and maintenance of transmission line and people living in vicinity)	i. Keep the safety offset, ROW, between buildings and transmission line ii. Provide earthing to all the metallic equipments near the transmission line iii. Provide proper health and safety equipments and trainings to officers iv. Educate farmers working near towers and in ROW about the safety hazards v. Restrict access near towers by fencing and warning signs	IEE, Section 4	Towers and places near human settlement and workplace	PIU-consultant	PIU

Monitoring Plan

Sr. No.	Environmental Monitoring Task	Monitoring Details	Timings	Executing Unit	Reporting Responsibility
1	**Preconstruction Phase**				
1.1	Up-Dating of EMMP during Detailed Design for Sub-components	Compliance check for updated EMMP during detailed design phase and incorporation of mitigation measures in the project design	In time for inclusion as part of bid documentation and environmental clauses in contracts	PIU	PIU reports to DABS
1.2	Lack of Environmental Specifications for Contractor in Bid Documents, Environmental Clauses for Contracts	Compliance with provision of key environmental inputs for inclusion in bid preparation documents and contractor contracts.	In time for inclusion as part of bid documentation and environmental clauses in contracts	PIU	PIU reports to DABS
1.3	Detail environmental planning of the transmission line route	Compliance with provision of key environmental inputs and maintaining safe distance from sensitive receptors and high risk/impact area.	Detail project planning	PIU	PIU reports to DABS
2	**Construction Phase**				
2.1	Physical Environment				

2.1.1	Soils and Topography	Compliance inspection and file report on whether erosion control measures are in place and functioning as specified, visual inspection for signs of leakages	Monthly	CSC	PIU
2.1.2	Surface water	Compliance inspection for signs of increased turbidity, change in river flow regime, untreated waste water disposal, leakages, general cleanliness	Monthly	CSC	PIU
2.1.3	Solid Waste	Compliance inspection at sites, visual inspection at camps, general cleanliness	Monthly	CSC	PIU
2.1.4	Air Quality	Compliance inspection at construction sites, visual inspection for signs of dust pollution during dry weather periods	Monthly	CSC	PIU
2.1.5	Noise and Vibration	Compliance inspection at construction sites of noise pollution restrictions outside permissible hours/ ambient noise measurements upon resident complaints	Monthly	CSC	PIU
2.1.6	Mines	Compliance inspection before starting of construction	Before construction	CSC	PIU
2.1.7	EMFs	Measuring EMF levels around the towers and where line passes through human settlements and workplace	Monthly	CSC	PIU
2.3	Socioeconomic Environment				
2.3.1	Community Impacts	Visual inspection and talking to people in order to learn their grievances regarding construction process and inconveniences, if any	Monthly	CSC	PIU

2.3.2	Health Safety and Hygiene	Compliance inspection at construction sites and talking to workers and people living in vicinity regarding any issues faced by them, checking total cases of work-related accidents, visual inspection of leakages from transformers/capacitors, chemical storage area	Monthly	CSC	PIU
2.3.3	Employment	Inspection of the total number of local workers, the workers' qualifications, place of origin etc.	Monthly	CSC	PIU
3	**Operational Phase**				
3.1	Physical Environment				
3.1.1	Soil	Compliance inspection and visual inspection for signs of leakages from transformers/capacitors, chemical storage area	Quarterly for 3 year post construction and later as part of regular maintenance plan of the line	i. Consultants-PIU ii. Plant Officers	PIU
3.1.2	Surface Water	Compliance inspection and visual inspection for signs of change in river flow regime and drainage patterns	Quarterly for 3 year post construction and later as part of regular maintenance plan of the plant and line	i. Consultants-PIUii. Plant Officers	PIU
3.1.3	Noise , Vibration and EMFs	Compliance inspection and general inspection for noises, vibrations and EMFs	Quarterly for 3 year post construction and later as part of regular maintenance plan of the plant and line	i. Consultants-PIU ii. Plant Officers	PIU
3.2	Ecological Environment				

3.2.1	Flora	General visual inspection	As part of regular maintenance plan of the plant and line	Plant officers	PIU
3.2.2	Fauna	Collect information on number bird strikes and species, from people living nearby and maintain record to understand the pattern and modify mitigation methods if necessary	Quarterly for 3 year post construction and later as part of regular maintenance plan of the plant and line	i. Consultants-PIU ii. Plant Officers	PIU
3.3	Socioeconomic Environment				
3.3.1	Health, Safety and Hygiene	Compliance inspection and regular general inspection of safety equipments, safe guard installed on sites, visual inspection of runoff signs of leakages from capacitors and reporting accidents, if any	Quarterly for 3 year post construction and later as part of regular maintenance plan of the plant and line	i. Consultants-PIU ii. Plant Officers	PIU

ANNEX D: Suggested Format of Environmental Performance and Environmental Effects Monitoring Reports for Pre-construction, Construction and Operation Phases

Monitoring Report

1. Introduction and Project Overview

Reporting period:	
Last report date:	
Key sub-project activities since last report:	
Report prepared by:	

2. Environmental Performance Monitoring

a. Summary of Compliance with EMMP Requirements (Environmental Performance)

EMMP Requirement	*Compliance Attained (Yes, No, Partial)*	*Comment on Reasons for Non-Compliance*	*Issues for Further Action*
1.			
2.			
3.			

b. Issues for Further Action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old Issues from Previous Reports					
1.					
2.					
New Issues from this Report					
1.					
2.					

3. Environmental Effects Monitoring

a. Environmental Inspection and Monitoring Results

Monitoring Parameter	*Comparison to Relevant Standard / Criteria*	*Comment on Incidences of Exceedance*	*Issues for Further Action*
1.			
2.			
3.			

b. Issues for Further Action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old Issues from Previous Reports					

1.					
2.					
New Issues from this Report					
1.					
2.					

4. **Appendices**
    a. **Correspondence**
    b. **Monitoring Results**
    c. **Etc.**

ANNEX E: Rapid Environmental Assessment (REA) Checklist

POWER TRANSMISSION

Instructions:

- This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: 220kV NEPS, Kunduz – Taloqan Transmission Line Afghanistan

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE	☐	×	
▪ PROTECTED AREA	☐	×	
▪ WETLAND	☐	×	
▪ MANGROVE	☐	×	
▪ ESTUARINE	☐	×	
▪ BUFFER ZONE OF PROTECTED AREA	☐	×	
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY	☐	×	

SCREENING QUESTIONS	Yes	No	REMARKS
B. POTENTIAL ENVIRONMENTAL IMPACTS SHALL THE PROJECT CAUSE…			
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?	☐	×	
▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?	☐	×	
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	☐	×	
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?	☐	×	
▪ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?	×	☐	**Increased soil erosion, pollution from waste to be minimized**
▪ increased local air pollution due to rock crushing, cutting and filling?	×	☐	**Excavation work, temporary access roads, removal of top soil**
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?	☐	×	**Manual removal of vegetation**
▪ noise and vibration due to blasting and other civil works?	×	☐	**Hammering for excavation of foundation, transport trucks etc.**
▪ dislocation or involuntary resettlement of people	☐	×	
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	×	☐	**Shall prefer hiring local workers but pressure on resources may cause conflicts**
▪ hazardous driving conditions where construction interferes with pre-existing roads?	×	☐	**As the poles might be parallel to existing roads, the construction work increases the possibility**
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	×	☐	**Possibility considered**
▪ creation of temporary breeding habitats for mosquito vectors of disease?	×	☐	**Possibility during construction phase at sites and camps**

SCREENING QUESTIONS	Yes	No	REMARKS
▪ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?	×	☐	**Possibility near transmission tower location and right of way when the route passes through villages and will be addressed in compensation plan**
▪ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	×	☐	**Regular cutting of tree branches near the cables**
▪ facilitation of access to protected areas in case corridors traverse protected areas?	☐	×	
▪ accident risks associated with maintenance of lines and related facilities?	×	☐	**Maintenance on high voltage electricity lines**
▪ health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?	×	☐	**Health impacts due to EMF considered but for 220kV will be negligible**
▪ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?	☐	×	

4.4